

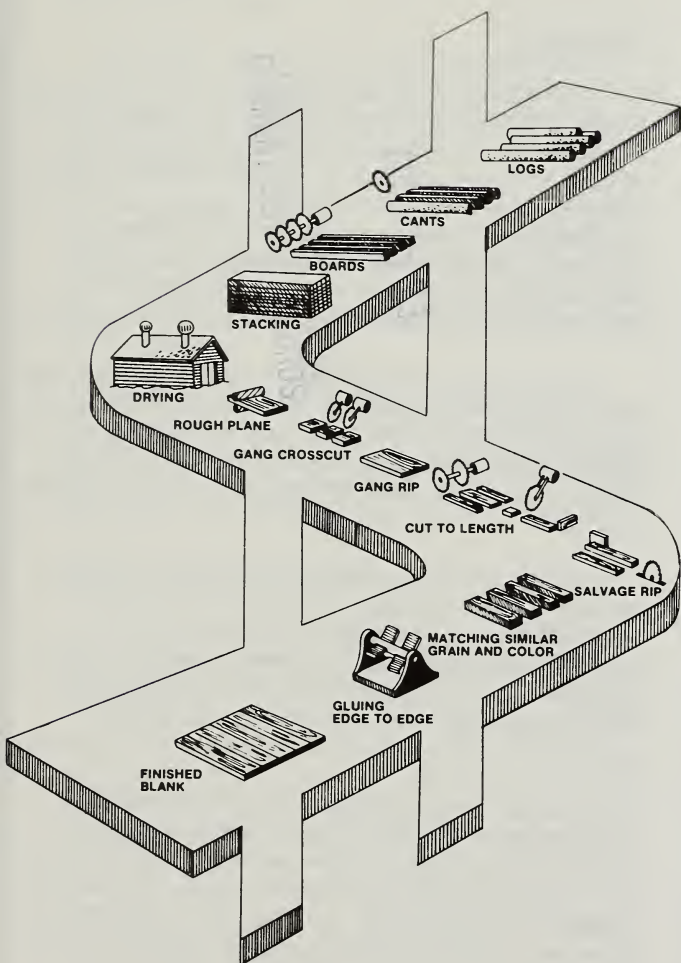
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the Same Economic Language When Evaluating System 6 and Standard-Size Hardwood Blanks



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Let's Talk the Same Economic Language When Evaluating System 6 and Standard-Size Hardwood Blanks

by Charles J. Gatchell
and Bruce G. Hansen

Introduction

"Will it pay?" is the key question in any investment decision. To find the answer, an economic analysis must be made. But a discussion of economics can be like a discussion of truth, beauty, or politics. Individuals have different ideas as to what should be evaluated, and this can lead to misunderstandings. We cannot compare apples and oranges. Yet, we sometimes compare "returns on investment" without first finding out how the numbers have been derived or what they represent.

A major source of misunderstandings is talking about percentages without defining the percentage base. If you are getting a 20 percent return and I am getting a 5 percent return, you are better off until we find out that yours is 20 percent of \$100 and mine is 5 percent of \$1,000.

Another misunderstanding occurs when talking about the cost per square foot of panel products or blanks. If you are talking about the costs to manufacture a square foot and I am talking about the costs to make and sell a square foot in the open market, then we will never be on the same wave length — and my costs should always be much higher than yours.

To avoid such problems, we present a brief summary of terms used in the economic analysis of System 6 and standard hardwood blanks. System 6 is a new technology for converting low-grade hardwood to high-value end products, and standard-size blanks are glued up, solid wood panels, of a predetermined size and quality from which manufacturers can cut pieces for their own products.

Talking the Same Language

There are four factors that are most important in deciding whether an investment is a good one or not. These are:

1. Initial investment.
2. Expected income.
3. Time.
4. Rate of return.

The factors operate as follows: A certain amount of money (1) is spent for production capability; products are sold and money comes in (2) over a period of years (3). We want to know if we will profit from this venture so we need some measure of the rate of return (4).

Terms and Definitions

The following definitions were used in our economic analysis of a new plant established to make standard-size blanks for sale in the open market:

Initial investment — The total cost of land, buildings, equipment, and working capital. The initial investment will vary depending on whether you start from scratch, modify a present plant, or sell off some equipment to purchase other equipment.

Working capital — Pays for raw material, work in process, and finished goods inventories as well as sales made on credit.

Expected income — The expected amount of revenue or income for each year of the time period. In general, expected income equals after tax profits plus depreciation.

Time period — Our time period is 10 years, a fairly standard interval.

Rate of return — An amount that can be calculated or specified. In general, management specifies the minimum rate of return it will accept. The results should equal or exceed that specification before management will continue.

Discounting — If we invest \$1.00 at 10 percent interest, we will have \$1.10 at the end of 1 year. To discount, we reverse the procedure. Specify the amount you want to end up with. Then, consider the rate of return you need and figure out how much you must invest today. For example, if you want \$1.00 a year from now, you must invest \$0.91 if the interest rate is 10 percent. This is discounting the dollar to \$0.91 at a rate of discount of 10 percent.

For a broad approach to economic analysis, we look at investment from two points of view: internal rate of return and net present value.

Internal rate of return (IRR) — The discount rate (IRR) that equates all of the revenues (R_i) over the time period ($i=1$ to n years) to the total amount of the investment (I_0).

$$\sum_{i=1}^n \frac{R_i}{(1 + \text{IRR})^i} = I_0$$

Essentially, we are solving for a rate of discount, the IRR, using known or expected revenues, the time period, and the initial investment.

Net present value (NPV) — The relationship between discounted revenues and the initial investment when the discount rate is specified (often by management) beforehand. We assign the discount rate (r) to all of the revenues (R_i) expected over the time period ($i=1$ to n years). When we subtract the initial investment (I_0) from the sum of the discounted revenues, we have the net present value (NPV).

$$\sum_{i=1}^n \frac{R_i}{(1 + r)^i} - I_0 = \text{NPV}$$

If the NPV is positive, the rate of return is even better than that specified.

Other factors affecting the results of economic analyses are:

Method of depreciation — We use depreciation in two ways: For accounting cost purposes, we use straight-line depreciation where the investment is written off in equal annual amounts over a 10-year period. Secondly, in calculating the IRR and NPV, we utilize the Accelerated Cost Recovery System schedule amounts to shelter a portion of income from taxation. Accordingly, in these analyses the full cost of equipment is depreciated in 5 years and the full cost of buildings in 15 years.

Tax rates — We use the maximum federal corporate rate of 46 percent. Because of various credits and capital gains possibilities, many corporations will pay less than this. On the other hand, we do not include state and local taxes.

Investment tax credits — Investment tax credits will increase net cash flow or revenue. However, we exclude investment tax credits in our analyses because they depend, in part, on the past and present earnings of each investor.

Inflation — We do not include a factor for inflation because of our inability to accurately forecast its rate and impact on future costs and revenues. And use of arbitrarily inflated values has the potential to make the investment seem better than it is.

Blanks for Internal Use Only

The input changes for an economic analysis of a company that wants to use its present facilities to make blanks for its own use. The basic question here is "What does it cost to make a square foot of blanks?"

The cost of making blanks for your own use should be less than the cost of making and selling blanks. The cost of blanks for internal use will not include selling costs, inventory costs, or an amount to cover the accounts receivable. Also, the initial investment would not include costs for existing land, buildings, and equipment that are already paid for.

An accounting-based cost summary for the manufacture of blanks has been developed. The essential features include:

- Costs for the first year of full production.
- Fixed and variable costs based on the square feet of output.
- Depreciation based on the difference between any new equipment costs and any revenue from the sale of old equipment. Depreciation of this net equipment cost is over 10 years, therefore, one-tenth of the total cost is used.

Economic analyses for both open-market selling and internal use manufacturing are used in research papers by Araman and Hansen (1983) and Reynolds et al. (1983), and publications in process by Reynolds and Hansen.

References

- Araman, Philip A.; Hansen, Bruce G. **Conventional processing of standard-size edge-glued blanks for furniture and cabinet parts — a feasibility study.** Res. Pap. NE-524. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1983. 11 p.
- Hansen, Bruce G.; Reynolds, Hugh W. **System 6 alternatives: An economic analysis.** In preparation. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station.
- Reynolds, Hugh W.; Hansen, Bruce G. **System 6 plant: Design manual.** In preparation. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station.
- Reynolds, Hugh W.; Araman, Philip A.; Gatchell, Charles J.; Hansen, Bruce G. **System 6: Used to make kitchen cabinet C2F blanks from small-diameter, low-grade red oak.** Res. Pap. NE-525, Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1983. 11 p.

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